Policy Studies Journal, Vol. 20, No. 4, 1992 (574-597)

The Politics of Citizen Access Technology:
The Development of Public Information Utilities in Four Cities

K. Kendall Guthrie and William H. Dutton

This article uses comparative case studies to examine the political shaping of public information utilities developed by American local governments. These public access computer networks are designed to facilitate access to community information and dialogue. We view technology design as analogous to developing public policy on citizen participation, where the "legislation" is imbedded in the technological design. Research sites included three adopter cities, Santa Monica, Pasadena, and Glendale, California, and one nonadopter city, Irvine. This comparison highlights key technology-policy choices (including the choice of not developing this application). Our analysis then examines the role of technological paradigms, local political cultures, and organizational arrangements in shaping municipal approaches to addressing these key policy choices.

During the late 1980s, American local governments began to apply information technology not only to speed up data processing but also to improve delivery of services, aid citizens interactions with local government, and potentially increase political participation (Dutton, Guthrie, O'Connell & Wyer, 1991; Kraemer, King & Schetter, 1985; Macuiszko, 1990).[1] This technology allows citizens to access a common computer database and often electronic mail facilities via terminals in public places as well as with private personal computers. The images of their developers closely approached visions of the "public information utility," first promoted in the 1960s (Sackman & Boehm, 1972; Sackman & Nie, 1973).[2]

While the technology to build such a system seemed futuristic in 1970, today many cities are already using the computer software and hardware necessary to support a community information system (Kraemer, King Dunkle, & Lane, 1986). Given a diminishing set of technical constraints, the degree that visions of the public information utility are realized depends more than ever before on political will as opposed to economic or technical feasibility.[3] Public information utilities are a technological innovation that can alter the way citizens participate in the political process. For example, the political implications of this technology might vary according to whether the designers choose to make their system a one-way, broadcast system or a two-way, interactive technology. These choices are in some respects legislating the content and flow of information in communities (Laudon, 1977; Dutton & Guthrie, 1991).

In this context, one can view the adoption and design of a community information system as a process comparable to legislating public policy on citizen participation. In this case policy is imbedded in the technology—the arrangement of people, equipment, and technique—rather than in law or regulation (Winner, 1986, p.

29). Like policy, technology is a social construction—the outcome of social and political choice (Danziger, Dutton, Kling, & Kraemer, 1982; MacKenzie & Wajcman, 1985; Bijker, Hughes, & Pinch, 1987). However, in the case of technology, these policy choices too often are obscured or overlooked because people focus only on decisions about the adoption or nonadoption of a technology rather than also attending to decisions about design and implementation of the technology that influence its use and impact.

Therefore, it is important to study the political shaping of these systems by early adopters. First, early systems are likely to become models for later adopters. What policy choices are imbedded in their design? Why were they chosen? Second, it might help account for the emergence of public utilities at this point in time. Is it simply a matter of lessening economic and technical constraints, or have changing attitudes and beliefs about electronic media made cities more open to the application of information technology for political communications?

This paper focuses on the political shaping of some of the first public information utilities developed by American local governments. Specifically, we compare the way four California cities chose to design and implement public information utilities. This comparison highlights key technology-policy choices (including the choice of not developing this application), which are summarized by an index reflecting the degree to which each city approached early visions of the public information utility. We explore several sets of factors that might explain the choices of cities. Our analysis highlights the role of technological paradigms and local political cultures in shaping municipal approaches to the development of public information utilities. While new technological paradigms might support the development of public information utilities, a continued rise of neoconservative politics might constrain their scope and even their diffusion.

Comparative Case Study Approach

Our analysis of the social shaping of information utilities is based on comparative case studies.[4] We began research on the development of public information utilities by conducting a qualitative, historical case study of the Public Electronic Network, developed in Santa Monica, California (Dutton & Guthrie, 1991). This case study identified several points of flexibility where actors within Santa Monica perceived choices in the design of their system. We extended the research to a comparative analysis of four cases in order to incorporate variation in policy choices as well as variation in the social and political context to explore the factors that might account for these policy choices.

Case Study Sites

We focused the present analysis on a similar system design and chose a purposive sample of four suburbs in the southern California area with relatively similar demographic characteristics (Table 1). Our reliance on qualitative, historical case studies limited the number of cases we could effectively study. The study was also limited by the small number of public information utilities operational in 1989 and 1990 as well as the existence of systems that were geographically close enough to conduct personal interviews and other field research critical to qualitative research. While efforts were made to match cities on some characteristics and factors most relevant to the present study, the four cities examined in this research vary in innumerable ways which are not discussed. The matching process could not account for all these variables.

Table 1
Selected Demographic Characteristics of the Four Cities

City	Irvine	Glendale	Pasadena	Santa Monica
Population	99,657	161,180	136,544	97,117
Percent White	90	82	57	83
Percent Black	1	1	27	4
Percent Hispanic	7	24	28	15
Percent Other	10	17	16	13
Percent College Grad[a]	28	15	19	24
Mean Income[a]	68,509	40,863	41,347	45,100
Median Income[a]	55,482	29,288	27,729	31,069

Source: Donnelly Demographics, 1989
Note: [a]1980 Census was most recent information available

Initially, we chose Pasadena to compare with Santa Monica. Both cities made extensive commitments to building public information utilities, but they differed dramatically in design. Compared to Pasadena, Santa Monica chose to develop (a) a more public versus private utility, and (b) a communication-oriented versus information dissemination-oriented system, by placing more emphasis on interactive communication among citizens as well as between citizens and public officials.

Santa Monica's Public Electronic Network (PEN) is a municipally-sponsored computer conferencing system. Via home computers or terminals in 13 public places around the city, citizens can access information about city services; send electronic mail to city staff, elected officials or other PEN users; and participate in numerous computer conferences on topics of local concern. The system was developed by Santa Monica's Information Systems Department in collaboration with a company that donated the software. (For a detailed description, see Dutton & Guthrie, 1991; Dutton, O'Connell & Wyer, 1992; Guthrie, 1991; Guthrie, Schmitz, Ryu, Rogers, & Dutton, 1990).

In contrast, both governmental and commercial interests were involved in developing Pasadena's community information utility projects (Guthrie, 1991). The Public Access Library System/Personal Access Regional Information System (PALS/PARIS) was jointly launched by a city government department, the Pasadena Public

Table 2
Selected Characteristics of the Political Culture in the Four Cities

City	Irvine	Glendale	Pasadena	Santa Monica
Adults Registered to Vote, 1988	83%	56	69	56
Adults Voting, 1988	68%	38	42	53
Adults Voting in last City Council Election	58%	22	20[a]	78
No. of positions for Citizens on Local City Commissions	70	60	250	97
No. of Citizen Commissions	32	10	17	20
Adults Registered as Democrats	29%	34	51	59
Adults Voting for Democratic Presidential Nominee, 1988	33%	36	53	63
Support for Campaign Reform[b]	58%	41	50	56
Support for Adjusting Gov. Spending Limits[c]	53%	46	57	61
Support for More School Funding[d]	54%	44	56	63

Source: Office of City Clerk in each city
Note: [a]65% voted in 1986 local council election.
[b]Place caps on individual campaign contributions and provide public financing of election campaigns for state office.
[c]Added more flexibility to the limits on state and local spending established by previous initiatives.
[d]Guarantees minimum level of state school funding and allows for excess state revenues to be spent on schools versus local tax rebates.

Table 3
Selected Characteristics of Local Government Organization and Technological Infrastructure

City	Irvine	Glendale	Pasadena	Santa Monica
No. of Employees (FT)	625	1,564	1,276	918
1989 Total Revenue (in millions)	$56	78	90	81
Per capita Revenue in 1989	$562	483	659	834
Data Processing Budget (in thousands)	$834	1,436	1,092	1,223
DP Budget as percent of Total City Budget	1.6	1.8	1.2	1.5
No. of City PCs, 1990	15	120	700	250
No. of remote on-line terminals, other than PCs, 1990	500	140	100	270
Yrs. Using Email	.5	1	4	6
Percent of City Employees Using E-Mail, 1990	48%	12	35	65

Source: Governments of each respective city

Library, and a local entrepreneur. PALS, which is free in local libraries and to all city workers, has several extensive databases of local information such as listings of local officials and community groups as well as a community calendar. PARIS is a subscription-based, commercial database system run by the private entrepreneur and geared towards people with home or business personal computers. PALS is available outside the library and city hall only via a subscription to PARIS.[5]

These two communities are similar in several respects. First, strong universities and hi-tech companies reside in or near each town. Both populations are more educated and information technology-oriented than average.[6] The political cultures of these two cities, defined as a widely shared, patterned view of the proper scope and behavior of public institutions, is similar as well.[7] Both cities tend to vote Democratic, although Santa Monica tends towards a more liberal brand of Democratic politics than does Pasadena (Table 2). While they differ somewhat in their partisan makeup, citizens in both cities are active in local government (Table 2). Officials in each city also view their citizens as expecting government to proactively work to provide the best services and amenities to improve the quality of local life, even when that means higher taxes.[8] Both local governments also pride themselves on their reputation for innovation.

These parallels between the activist political cultures of Santa Monica and Pasadena led us to incorporate a third city, Glendale, a community which also launched a public information utility but whose local culture and populace was less activist and more conservative (Guthrie, 1991). Glendale residents vote more Republican on both national and local issues than do citizens of Santa Monica or Pasadena (Table 2). Moreover, officials in this town see their citizens as wanting a smaller, less activist government. The majority of these citizens prefer private rather than the public allocation of goods and minimal intrusion of government. For example, the Glendale government spends far less per citizen than either Pasadena or Santa Monica (Table 1). Citizens in Glendale are less involved in local municipal affairs and less politically active, as indicated both by voter registration rates and the number of seats per capita for residents on city commissions (Table 2).

Despite these differences, Glendale's public library hired the entrepreneur involved in Pasadena's information utility to develop a public information network for Glendale. Glendale created Infonet to provide municipal and nonprofit information and referral providers with a common database of community organizations and local events. In contrast to PEN and PALS access policies, only 12 agencies had Infonet terminals, which were not directly accessible to the public. In late 1990, the librarians and city management began investigating the idea of revamping InfoNet into a larger, public-access revenue-generating database.

Finally, we chose Irvine, California as a fourth case because it did not choose to develop a public information utility, even though it seemed to be a logical candidate. Beginning in the 1970s, Irvine has pioneered both the development of interactive cable to deliver governmental and educational services and local government applications of management information systems. (Dutton & Kraemer, 1985; Kataoka & Corey, 1979; Kraemer, King, & Schetter, 1985). This would suggest that this city might well be receptive to the idea of a public information utility. In fact, Irvine officials visited Santa Monica to learn more about PEN and several Irvine officials also knew about events in Pasadena. Nevertheless, they decided not to develop a similar system.

The reason for this decision was not immediately apparent to us. Irvine, like Santa Monica and Pasadena, has an active, educated, politically involved citizenry (Tables 1 and 2). The Irvine public is even more uniformly affluent, which might lessen concerns over citizens having equitable access to the information utility. Like Pasadena and Santa Monica, citizens expect their local government to provide the amenities to make it a pleasant place to live. While Irvine residents vote conservatively in partisan elections, during the 1980s they supported progressive policies on the local level (Luther, 1989). On a number of state ballot initiatives, voters in Irvine cast their ballots in favor of expanding government spending for schools and services, voting more like residents of Pasadena and Santa Monica than voters in Glendale, who take a more limited view on the role of government.[9]

Field Research

In each community, we conducted a series of semistructured interviews with the individuals involved in designing the respective information utilities as well as people representing interests which had the potential to be involved. In the case of Irvine, we interviewed individuals who represented departments that would have been involved had the city chosen to develop a system.[10] We audiotaped and transcribed all formal interviews. City documents, internal memos, and media articles relating to the issues were also collected to supplement the interviews. After the cases were drafted, key informants in each community were sent narrative histories of the events, and their comments were incorporated when deemed appropriate.

The Adoption and Design of Public Information Utilities

Officials in all four cities view PEN, PALS, PARIS and Infonet as members of a similar class of information systems. They are defined by the use of terminals (including personal computers located in households or businesses) to access public information stored on a central computer. But within these broad outlines, development proceeded differently in each city.

Design and Policy Choices

Seldom is there a single best way to do something. There are numerous points of flexibility in the design of technologies, including public information utilities. Some design alternatives can be key policy choices in that they may bias a technology toward particular social uses and outcomes. As noted above, for example, a public information utility can be designed to block or facilitate interactive versus one-way communication. The policy implications of such alternatives are constant, even if policymakers fail to recognize them.

The following are key policy choices about the design of the public information utility which emerged from the case studies: (a) *system capacity* (both in terms of computer memory and the number of simultaneous users it can support); (b) *architecture of the communications channels*, which can include broadcasting from one to many, also vertical channels between officials and citizens, horizontal channels between citizens, and many-to-many channels whereby any one user can broadcast to all others; (c) *accessibility*, based on the dispersion of terminals and the monetary cost of using them; (d) *information content*, which can be more or less oriented to public affairs depending on the balance of commercial versus noncommercial messages; (e) *model of editorial control*, which includes viewing the public utility operator as a publisher with complete control over content versus a common carrier system which carries many voices; (f) *ownership*, which could be public, private, nonprofit ownership or a combination and ; (g) *financing*, which could be public, commercial, and/or subscription based.

Early advocates of public information utilities argued that, just as access to power and water were considered a necessity during the industrial age, all citizens in the postindustrial age would need easy access to information (Sackman & Nie, 1973; Sackman & Boehm, 1972). Therefore, an archetype public information utility would have a large capacity, the maximum range of communications channels; wide accessibility; emphasis on public rather than merely commercial information; a loose model of editorial control; noncommercial ownership; and nonfee-based financing.

Table 4 identifies these points of flexibility by comparing aspects of the design of the public information utilities developed by Glendale, Pasadena, and Santa Monica, respectively. Each dimension can be rated by the degree to which the city approached an archetype of a public utility. If each city is assigned a rank order, the sum of its ranks across the seven dimensions provides a crude index of its relative standing as a community information utility (Table 5.) Other dimensions might be equally relevant, such as permitting anonymous communications. Moreover, not all characteristics may weigh equally on the success or impact of a community's system. However, this rank order measure serves as an adequate means of illustrating the degree to which each of these systems tends to approximate an archetype. But based on this index, it is possible to rank order the three public utilities by the degree they approach an archetype of the public information utility, from Glendale's InfoNet, with a score of 9 to Pasadena's PALS/PARIS and Santa Monica's PEN system, with scores of 11 and 18, respectively (Table 4).

Santa Monica's PEN system tended to more closely approach the archetype public information utility. It was designed with a greater capacity; a more flexible architecture, permitting horizontal communication; less restricted access; a broader range of content, including public affairs discussion; less editorial control by the provider; public ownership; and public funding. Glendale's InfoNet ranked the lowest on this index. While the system is technically similar to Pasadena's PALS/PARIS systems, InfoNet was designed with less capacity; a narrower range of information services, and less public accessibility.

Factors Shaping Technology Policy Decisions

The cases demonstrated a range of *technically feasible* options. The designers based their decisions not simply on what was technically feasible but also on social and political grounds not determined by the technology. At the initial stages of this research, we expected normative conceptions of democratic participation to play a dominant role in shaping the design of information utilities. Therefore, we expected

Table 4
Policy Choices In Design of Information Utilities in Three Adopter Cities

Policy Choices	**Glendale's (InfoNet)**	**Pasadena's (PALS/PARIS)**	**Santa Monica's (PEN)**
Capacity	6 ports, small memory	17 ports, large memory	50 ports, large memory
Architecture for Communication	Broadcast	Broadcast for PALS, PARIS has 2-way horizontal channel	Broadcast, 2-way vertical and horizontal
Access	No public access, restricted to 12 steering committee members	Free public terminals in library, fee for home & business	No fee for residents registered, 13 public terminals
Content	Community calendar, community group information	Calendar, gov't & community, commercial information	Government, community calendars, information, mail & conferences
Editorial Control	Provider as publisher	Provider as publisher	City as publisher for bulletin boards, common carrier for conferences and mail
Ownership	Public: Community Agencies (including the City)	Mixed: Municipal and Private	Public: Municipal
Source of Funds	Library Grant, limited City funds	Library Grants, Subscriptions	Information Systems Dept., City General Fund
Public Utility Index Score[a]	9	11	18

Note: [a]Score is the sum of each system's rank order on each dimension, scored by the degree to which it approaches the ideal public information utility.

Table 5
Index of Public Information Utilities, Based on Rank Ordering of Characteristics Compared to Archetype

Dimensions of Technology Design	Irvine	Glendale (InfoNet)	Pasadena (PALS/PARIS)	Santa Monica (PEN)
Capacity	0	1	2	3
Architecture	0	1	2	3
Access	0	1	2	3
Content	0	1	2	3
Editorial Control	0	1	2	3
Ownership	0	2	1	2
Financing	0	2	1	2
Index Score	0	9	12	19

that the political culture of local communities would have a major influence on the design of the information system. Other characteristics of the local setting that we expected to shape technological preferences included economic factors, organizational arrangements, and the existing technological infrastructure.

We found each of these sets of factors to have some role in shaping technological design. However, we did not fully anticipate the role that technological paradigms played in defining problems and solutions. In fact, the acceptance of a particular technological paradigm tended to moderate the role of other factors in the design of information utilities, making their design more independent of political, organizational, and economic factors than we had expected.

Technology Shaping Technology: The Underlying Paradigm

Existing technology presents a variety of opportunities, problems and constraints that shape the future of technology (MacKenzie & Wajcman, 1985). One way in which existing technology shapes new technology is by providing mental models of solutions. The most general pattern emerging from the comparative case study was the central role played by what might be called the "technological paradigm" of the designer (Guthrie, 1991). Technological paradigms are the widely accepted, exemplar puzzle solutions, employed as models or examples, which replace explicit rules as a basis for the solution of the remaining puzzles of technology development. The term takes inspiration from Kuhn's (1970) discussion of the role played by scientific paradigms in scientific research.[11] The technology designers in our case studies coped with developing these new community information utilities by viewing the project as analogous to existing exemplar technologies with which they were familiar.

Across the case study cities, developers employed four distinct paradigms: an electronic mail, a broadcasting, a database, and a management information system

(MIS) paradigm (Table 6). That is, technology shaped technology by providing alternative paradigms from which designers could choose to model their public information utilities. Moreover, once designers began working within one paradigm, they overlooked other potential design strategies which did not fit into that model.

An electronic mail paradigm guided thinking in Santa Monica and helped encourage plans to redesign the Glendale system. Implicit in this model is an effort to solve the problem of maximizing communication *among* a community of users by making it easier to exchange information with minimal regard to real time, space, or the social hierarchy. Also implicit is the idea that the technology primarily consists of a network of communications channels, the content of which is decided by the users and not by the communications system owner.

In Santa Monica, the choice of this paradigm stemmed from both personality and historical circumstance. PEN designers saw the project as an extension of the city's electronic mail system, which council members via laptop computers used to communicate with city staff and one another. While some of the early proposals for citizen access in Santa Monica were more oriented towards information dissemination—simply letting residents read staff reports and council agendas—the electronic mail paradigm led key participants, particularly the Director of Information Systems, who implemented the electronic mail network, to consider a citizen-city hall communication link and, eventually, citizen-to-citizen communication as a logical, if not necessary, component of any public information system.

One reason why Santa Monica officials might have focused on electronic mail as a technological paradigm is that they had relatively more experience with this system—over six years—compared to only six months of electronic mail use in Irvine at the time of our study (Figure 1). In fact, there is a clear association between each city's experience with electronic mail and the degree to which it approaches the archetype public information utility (Figure 1).

The broadcasting and database paradigms place greater emphasis on content than on the architecture of communication channels. The developers in Pasadena explicitly adopted a U.S. commercial broadcasting paradigm. From their perspective, the problem was how to allow one agent to send the same information to the maximum number of dispersed people. Implicit in this paradigm is the idea that the owners of the communication channel control information content and broadcast what is beneficial to them. For example, the Pasadena city government benefitted by "broadcasting" standardized city information as a way to let residents help themselves to information rather than tying up staff time. The entrepreneur expected revenue in the form of subscriptions and advertising. On the other hand, because this paradigm defines communication channels as one-way and one-to-many and does not focus on feedback or communication among users, it inhibited people in Pasadena from considering two-way communication or computer conferences as a logical part of their public information utility.

A database paradigm guided the Infonet developers in Glendale and, to some extent, the librarians in Pasadena. This paradigm defines the problem as maximizing the accessibility of a particular body of information among a specific group of users. It aims to facilitate retrieving the particular information people want, at the time they

Table 6
Dominant Technological Paradigms in the Four Cities

Type Paradigm	Type I MIS	Type II Database	Type III Broadcast	Type IV Mail
Focus	Information systems for operations and management control	Maximize access to data base among contained group of users	Disseminate information from one to many	Inter-personal and group communication (many to many)
City	Irvine	Glendale	Pasadena	Santa Monica
Status of Public Information	Not developed	InfoNet	PARIS/PALS	PEN
Exemplary of type	Geographic Information System	Electronic Library Catalog	Electronic Bulletin Board	Electronic Mail & Conferences

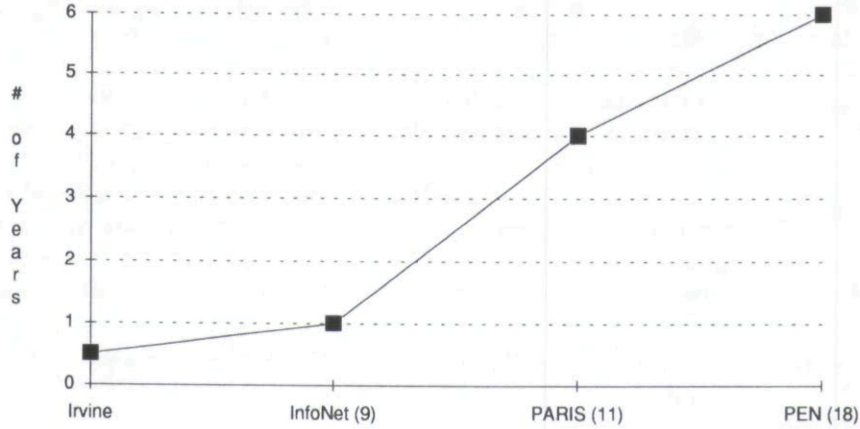
want, and in the place they want. Here, emphasis is placed on the information that users want to receive rather than what information someone would like to disseminate. The user community in Glendale was defined narrowly as community information and referral providers. The Pasadena librarians, by contrast, defined the community as local citizens, including community organizations.

The broadcasting and database paradigms focused designers on information content rather than on communications among people. The paradigms had no component for two-way communication, even though the technology used for PALS and InfoNet could accommodate it. As Kuhn (1970) suggested, the paradigms or models which developers employed focus attention on particular definitions of the problem and solution. The choice of paradigm helps them define the problem as well as the solution.

In our case cities, the choice of paradigm appeared to be based primarily on the background and professional training of the developers. The technology designers in this study came from different professional communities, which, like Kuhn's scientific communities, each had their own training program and set of widely accepted exemplar problem-solutions. The information utility designers' professional training taught them to see a new technological problem in terms of the exemplars from within their own field.

The Pasadena entrepreneur Ed Stevens, a former radio station owner, said that he employed commercial broadcasting as a model because "The script's already

Figure 1. Years of E-mail Use in Four Cities



been written in the broadcasting world. Since that's the one I know, that's the one I'm using" (Stevens, 1990). Similarly, the librarians all initially employed a database paradigm, drawn from their recent success in computerizing card catalogues. The major success in the City of Santa Monica was implementing an electronic mail system for city staff and city council members.

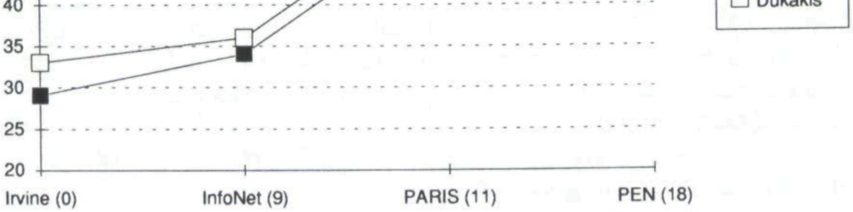
In contrast to these adopters, Irvine officials seemed wedded to a more traditional MIS paradigm for municipal computing. Irvine developed several very successful management information systems. For example, they were an early adopter of a fiscal impact budgeting system (Dutton & Kraemer, 1985). When data processing managers thought about citizen access to information, they thought in MIS terms, looking to computers to help better manage and process vast quantities of information. Therefore, they considered allowing citizen access to the geographic-based information system they were in the process of developing so that residents could inquire about land use and other geographically coded information. Although Irvine had recent experience with electronic mail, this technology tended to be used by secretaries rather than by top and middle managers. Irvine also had recent negative experience with implementing an automated attendant and voice mail system within city hall, which quickly gathered many citizen complaints. While their Information Systems Managers had initially viewed this technology as a possible paradigm for public access, the negative publicity branded voice mail across the city as a generally untenable paradigm.

Political Culture

The literature on technology development led us to expect technological change to reflect and reinforce the value priorities of the cultures from which they emerge (MacKenzie & Wajcman, 1985; Kraemer & Dutton, 1979; Danziger, Dutton, Kling, & Kraemer, 1982; Abramson, Arterton & Orren, 1988). The local political culture had some influence on the designer's conception of intended users, the architecture of the communications network and information utility content. Three aspects were particularly important: (a) prevailing ideology, (b) citizens' expectations of local government, and (c) levels of political participation.

A liberal Democratic belief system seems to have provided a conducive climate for the birth of a public information utility. For example, there is a clear association of both Democratic voter registration and the percentage vote for the Democrats versus the Republicans in the 1988 Presidential election with the degree each city approached an archetype public information utility (Figure 2). Our case studies also underscore the important role played by liberal ideology in shaping the early notions about the potentially expansive role of a public information utility, particularly in Santa Monica (Dutton & Guthrie, 1991).

Figure 2. Relationship between System Ranking and Democratic Voting



Citizens' conceptions of the appropriate role of local government marked another characteristic of political culture that shaped the design of information utilities. The cities in this research exemplified two of the four ideal types of governmental roles identified by Williams and Adrian (1963). Officials in Pasadena, Irvine, and Santa Monica perceived their citizens as expecting the municipal government to provide and secure life's amenities for its citizens (Barrette, 1988; Stronjy, 1990; McIntyre, 1990). In contrast, officials in Glendale believed that citizens expect only a caretaker government, which limits itself to traditional services and keeps taxes to a minimum (Bremberg, 1990; Raggio, 1990).

Across the cases, once an actor within the city was committed to the concept of building a public information utility, the local political climate structured designers' strategies on who should own the system, how to finance it, and how to manage it. Glendale's conservative, caretaker political culture restricted the range of owners deemed feasible to the Glendale librarians who were advocating the development of a city-wide automated information system. First, in contrast to the other cities, officials in Glendale were more likely to be skeptical than intrigued with staff ideas to develop a new municipal service (Bremberg, 1990; Raggio, 1990). Keeping taxes low took a higher priority than looking innovative. This climate eliminated the design option of extensive municipal funding or involvement. Therefore, the Glendale librarians saw it as most logical to suggest drawing community groups into the planning and management of the technology (Thompson, 1990). In fact, the library originally hoped to form a consortium of municipal and nonprofit information providers, who would manage themselves (Thompson, 1990). Subsequent plans to revamp InfoNet also reflected efforts to fit the city's political culture by including access fees and advertising to make the utility revenue generating (Curzon, 1990; McFall, 1990). Finally, fostering political participation was not considered an important goal of their public information utility, as was the case in other cities.

Policymakers in communities which expected their government to provide amenities seemed to have a wider range of politically feasible options. First, communities such as Pasadena and Santa Monica were much more likely to see launching a public information utility as an extension of their existing outreach programs through other media and consistent with the city's overall policy of rewarding innovative ways to provide city services (Finkel, 1988; Jalili, 1990; McIntyre, 1990). Such endeavors were viewed as creative leadership rather than a risky investment and judged primarily on the expected benefits of the service rather than the costs. Launching an information utility was seen as taking the lead in what policymakers expected to become a dominant medium of communication in the future, even while they realized that it was unlikely to be a cost-effective method of city-citizen communications for a number of years.

The level of political participation in a community affected the designers' conceptions about the attributes of intended users and the kind of information the designers saw as most important to place in the utility. For example, the dominant political ideology in Santa Monica placed a high value on both citizen involvement and debate over community issues (Kann, 1986). This value supported the information system director's advocacy of computer conferences and electronic mail, which were designed to facilitate political discussions. Likewise, the content of the Glendale databases reflected that community's deemphasis on city-funded services and citizen involvement in local government. In contrast to PEN and PALS, InfoNet provides no information on the public policy process and considers citizen commissions and city services as simply another community service, included in the same database with the listing of garden clubs and Alcoholics Anonymous.

However, while the political culture appears to influence how cities design a system, it did not trigger adoption. Irvine shared aspects of the political culture that seemed so significant in the adopting cities. The Irvine city government valued its reputation for innovation. It viewed its citizens as expecting the city government to provide and secure amenities for the community. The management placed a priority on servicing all citizen information inquiries. Moreover, the citizens in Irvine are as involved in their local government as those in Pasadena and Santa Monica. Finally, the high socioeconomic status of the population means that home computer penetration perhaps is even higher than in Santa Monica, since personal computer ownership is highly associated with income (Dutton, Rogers, & Jun, 1987).

Economic Factors

Economic considerations also influence the design of technology (MacKenzie & Wajcman, 1985; Dutton, Blumer, & Kraemer , 1987). However, the present case studies suggest that economic factors played a marginal role in the design of information utilities. For example, community wealth is often associated with costly technological innovations simply because a wealthier community has more slack resources. In the present case, then, one might expect that the less well-off communities might be less likely to launch a public information utility or more likely to look to outside resources such as venture capital or user fees to support its development. However, our case studies suggest that the wealth of the community or local government was less important than the *priority* placed on economic considerations.

All three adopter cities have comparable average incomes, meaning that they have a comparable tax base (Table 1). Glendale's smaller city budget stems not from lack of community resources but from the political culture which places a higher value on low taxes and less government than do the other cities in this research (Table 3). Moreover, despite comparable community resources, Glendale officials placed much greater emphasis on the costs and efficiency of the proposed public information utility than did officials in the other two cities, who never tried to promote the concept on an economic basis. When evaluating city programs, it is the political culture, not the extent of community resources, which guided policymakers in Glendale to place more emphasis on a proposed program's cost-effectiveness than on the merits of the service.

Moreover, the city with the wealthiest tax base, Irvine, chose not to implement a community information utility. Irvine staff said that lack of funds is rarely cited as a reason not to pursue a project which citizens or city management otherwise see as worthy. Irvine's nonadoption of an information utility appears attributable to other factors, such as the city's Information Services manager's lack of interest in this idea, and the fact that Irvine did not fund a public library, which the other cases demonstrated to be a potential initiator.

Economic factors did play a role in the design of the technology, but they were intertwined with political considerations. Pasadena librarians decided to contract out for computer space via a joint venture in order to avoid an expensive computer purchase up front, equipment which might be useless if the innovation failed (Szynaka, 1990; Johnson, 1989). However, the librarians also saw the joint venture as a means to secure a funding source more independent of the vicissitudes of city hall, a political rather than economic goal. Economic factors shaped some content considerations in Pasadena. Pasadena only considered designs which included a mechanism for the entrepreneur to generate revenue. (Syznaka, 1990; Stevens, 1989, 1990).[12] That meant designing PALS and PARIS with an eye to information that people might eventually be willing to pay to receive in their homes, rather than merely information that the government would like to broadcast (Stevens, 1990).[13]

Interest Group Politics

Developers did make some effort to accommodate the needs of particular interest groups, but those groups varied across communities. Pasadena city staff and officials attempted to accommodate the needs of the business community when designing the databases. A School Find database, which matched addresses with school assignments, was added to PALS at the request of the school district and real estate community, even though the librarians thought it had minimal information value. The librarians designed two databases, Local Business and Statistics, not for citizens but for business users.[14]

This strategy stands in contrast to Santa Monica, where the business community has never recovered the clout it enjoyed in city hall before the advent of rent control in the late 1970s changed the political lines in the community (California Commission, 1989). PEN designers did not include information specifically aimed at local business rather than residential users, as was the case in Pasadena. In fact, initially those people who ran businesses in Santa Monica could not even register on PEN unless they were also residents.[15]

In Santa Monica, concerns over the business community did emerge, but in a more indirect way. The city manager's office was concerned that private videotext service providers might complain about the city competing with them. This led the city to restrict who could use PEN and to ban commercial uses (Barrette, 1988). This potential conflict also led the city manager's office to discourage proposals for electronic mail among citizens.

Possibly because of the liberal Democratic flavor of Santa Monica politics, PEN designers were more attuned to the reaction of local political factions and citizen activists than the local business community per se (Phillips, 1988). First, public terminals were added to the PEN design in order to head off liberal criticism that PEN would primarily benefit well-off computer owners. The management also feared that controversy would arise if one political faction was seen as dominating the use of PEN to advance its own political purposes, and thus they disallowed using PEN for political campaigns. However, in the case of PEN, no political group or faction voiced any demands explicitly. Instead, the city management, wanting to keep PEN from becoming controversial, tried to anticipate potentially contentious issues and address them before they arose.

In Glendale, a lack of business involvement appeared to be one factor contributing to InfoNet's slow start. In line with Glendale's more conservative, Republican politics, the Glendale business community played a larger role in the politics of this city than in the other communities in this research (Raggio, 1990). The Chamber of Commerce, as one of the active forces in the community, was included on the InfoNet steering committee. However, since the committee was dominated by nonprofit information providers, the interests of the nonprofits seem to have prevailed in the design.

Glendale businesses were not solicited either as information providers or system users. Nor did the InfoNet steering committee include any type of information of particular interest to the business community. It appears that where the business community is an important political actor in a community, its lack of involvement and enthusiasm can impede an information utility's success. These business groups may not have consciously chosen to sabotage InfoNet's development. Yet their lack of interest may have deprived the public information utility's designers of some of the prestige that might have helped maintain the commitment of the information and referral providers' consortium, which the librarians had hoped would manage the public information utility.

Organizational Factors

It was also striking to note that, across all four cities, citizen and community groups were generally not involved in the development of public information utilities. This technological innovation was initiated and designed primarily by local government agencies, who saw such projects as achieving a variety of goals beneficial to the various departments involved as well as the city as a whole. City management, with the aid of lay politicians and appointed officials, decided what kinds of information these citizens should have access to, who they should be able to talk to, and how much it should cost them. The systems examined in this research were not designed or implemented to meet any expressed citizen demand for this technology.[16] Only Glendale recruited community groups into the design process, but this action stemmed as much from a need to share the cost of development as from any democratic notion of soliciting community input. Technology developers in Glendale have not pushed to involve citizens or community groups into discussions about redesigning InfoNet.

In many cases, once technology developers had decided to develop an information utility, they made some efforts to assess the information interests of community groups, as with the Pasadena library's community needs assessment (Cain & Zorbas, 1983), or to anticipate interest group concerns, as with Santa Monica's decision to ban political campaigning and use by nonresidents. However, this action stemmed from the desire to ensure the success of the technology rather than to respond to citizen demands for involvement, since there were none.

Government interest rather than citizen demands spurred the development of public information utilities in our case studies. This incidental involvement of citizens tends to support the perspectives on the role of government as an independent actor rather than simply register the demands and supports of groups outside the government (March & Olsen, 1989; Nordlinger, 1988; Krasner, 1984; Evans, Rueschemeyer, &

Skocpol, 1985). In the case of these systems, providing citizens with easier access to information and communication services facilitated organizational goals.

In each city, a particular department emerged as a primary proponent of an information utility. Absent this champion, it was not built, as in the case of Irvine. The departments advocated such a move for internal reasons ranging from expanding their authority, to garnering favorable publicity, to increasing the efficiency of their operations. For example, the Santa Monica Information Systems Director initially did not act on the citizens' 1986 request for access to the city's computer because he viewed the proposal to provide council agenda and staff reports as a service for which there would be little demand (Phillips, 1988). However, six months later, after he surveyed residents and began to think about this system as an extension of electronic mail, he began to envision a viable service that would test his reputation and extend the reach of his department of information systems, potentially into households of the city.

In Glendale and Pasadena, the librarians saw a public information utility as a matter of organizational survival—a way to get the library involved in a city service more relevant to the modern information age (Curzon,1990; Szynaka, 1990; Thompson, 1990). They also expected it to ease the task of answering information and referral questions.

Finally, as noted above, one reason why Irvine chose not to adopt this technology was that the city's manager of information services was not interested (Ristow, 1990). The department was occupied with other computer projects, and the top manager was unconvinced that such a system would be successful or useful. Since computer systems were centrally controlled in Irvine, it was unlikely that any other department could have launched an information utility without the support and significant involvement of the Information Services Department. These findings would suggest that perhaps one of the main reasons why more governments have not launched public information utilities is because they do not see such a project as benefitting their organization.

Conclusions

A growing number of American local governments are interested in the idea of a public information utility (Dutton & Guthrie, 1991). Such systems are now more technically and economically feasible. This study looked at the emergence of public information utilities in four cities, one of which chose not to develop such as system. The four cities varied significantly in the degree to which they followed the archetype of a public utility, illustrating the malleability of the technology.

By examining the evolution of a new communications system in contrasting environments, this study investigated how social factors influence the shape of technology at those points of design flexibility. We described how characteristics of the political culture, interest group politics, economics, organizational arrangements within the local government, and prevailing technological paradigms structured designers' options. While our limited sample and analysis does not permit us to determine what factors caused cities to diverge in their design choices, a few explanations seem most consistent with our comparative, qualitative, historical observations within and across each city.

We found that technology does have a force of its own. Existing technology structured the definition of problems and solutions and thereby influenced policy decisions. It did so primarily by establishing dominant technological paradigms or models which designers applied to new communication systems. The prevalence of an electronic mail, broadcasting, database, or MIS paradigm affected the design as well as the adoption of public information utilities. As more cities and governments generally become more familiar with electronic mail and conferencing systems, which is likely, the idea of extending this technology as a public utility might become less novel and more acceptable, regardless of local political values and interests. It is also likely that the success or failure of this early generation of public information utilities will influence what local governments perceive as the exemplar solution to the problem of facilitating city-citizen communication and thereby guide the development of future projects. Thus, technological paradigms are not simply an independent variable affecting the emergence of new communication technologies, but also a dependent variable affected by ongoing experiences with technological change.

That having been said, the picture of technology development which emerged from this study of four cities was not of some technologically driven, value-neutral chain of events. It was a series of choices where humans decided at various critical junctures what structure the public information system would take. From this vantage point, technology design is clearly similar to a public policy process, where the outcome is determined more by the authority, influence, and goals of the actors involved and the environments in which they work than by technological necessities.

However, the range of potential choices was constrained by the political culture and organizational arrangements within which the developers of public information utilities operated. We found that liberal Democratic voting patterns seemed to capture aspects of local political cultures that were congenial to the development of model public information utilities. The Democratic party has a tradition of extending access to the ballot box and this liberal democratic stance might well extend to newer electronic means of communication and participation in public affairs. Much would lead us to expect the opposite—that liberals would oppose teledemocracy schemes out of a fear that making political participation more dependent on interaction with complex technology would reinforce socioeconomic disadvantages. Instead, leaders in both Santa Monica and Pasadena supported this innovation as a way to improve citizen participation, although their support was contingent on the provision of public terminals to insure access to those without the private resources to participate on this system. Given the vitality of neoconservative views, the political cultures of most American cities are likely to remain less congenial to the development of public information utilities than were those of Santa Monica and Pasadena.

* * *

William H. Dutton is professor of communication at the Annenberg School for Communication and the School of Public Administration at the University of Southern California. He received his doctorate in political science from SUNY at Buffalo in 1974. His research focuses on the political aspects of communication and information technology. In addition to his continuing study of PEN, he is conducting cross-national research on communications policy in Britain, France and Japan, using the approach of an ecology of games.

K. Kendall Guthrie is a policy and management analyst with the New York City Department of Telecommunications and Energy, where she is developing projects using telecommunications technology to improve government productivity and service delivery. She received her Ph.D. from the Annenberg School for Communication at the University of Southern California in 1991. Her research interests include telecommunications policy and the political aspects of communication and information technology.

Notes

[1] The vast majority of computer applications in American local governments focus on administrative support and only indirectly promote services to citizens (Danziger, Dutton, Kling, & Kraemer, 1982; Kraemer, King, Dunkle, & Lane, 1986).

[2] The few projects launched in the previous decade failed to achieve more than experimental status. See Arterton (1987) for a discussion of these projects.

[3] Hardware and software to support electronic mail, conferencing, and bulletin boards are widely available to organizations of all sizes. In 1990, a city could start a small personal computer-based information utility for less than $1,000. Simple audiotext boards can be purchased for around $2,000.

[4] Our approach parallels urban policy research focused on the factors explaining why cities implement different policies to handle similar problems ranging from school desegregation to fluoridation to economic development (Bachrach & Baratz, 1970; Clark, 1981; Crenson, 1972; Williams & Adrian, 1963; Wilson, 1968). More recently, Dutton, Blumler and Kraemer, (1987) and Schneider, Caron, Miles, Thomas, and Vedel (1990) have used a comparative approach to identify factors shaping the development of communication and information technology, specifically cable television and videotext.

[5] Independently, and at about the same time, the Pasadena police department developed a small personal computer-based interactive bulletin board staffed by the Crime Prevention Bureau to provide crime prevention information and receive comments from citizens about police issues.

[6] For example, a city survey found that over 30% of Santa Monica households had a personal computer (Dutton & Guthrie, 1991).

[7] Our discussion of political cultures is based on early work by Pye (1968), Wilson (1968), and Williams and Adrian (1963).

[8] Our characterizations of the local political cultures of each city are based on qualitative observations and interviews described more fully in Guthrie (1991)

[9] Guthrie (1991) provides a more detailed history of events in each city.

[10] In all, we conducted more than 72 interviews with 54 people. This material was supplemented with numerous informal, followup conversations. We interviewed 15 different people in Santa Monica, 15 in Pasadena, 13 in Glendale and 13 in Irvine. In each city, we chose representatives from the city management, the city council, the city library, the city's information systems department, the business community, and citizens/community-based groups.

[11] Our concept of technological paradigm is more akin to Kuhn's idea of a scientific paradigm than the notions described in works on the social shaping of technology such as Constant (1980), Dosi (1982), MacKenzie and Wajcman (1985), Van Den Bel and Rip (1987). For a more detailed comparison, see Guthrie (1991).

[12] The entrepreneur's involvement with the library was motivated not simply by the fees he received for building the PALS databases but also by the potential to create a model he could market to home and business users as well as other cities.

[13] It should be noted that Stevens was less driven by profit than the prospect of developing an innovative technology. An "inventor type," Stevens did not solicit clients or market subscriptions until he had worked with the library for five years.

[14] However, these two databases were slow to come on-line, partially because they received lower priority than the nonprofit and city government-oriented databases, and partially due to technical difficulties in designing them.

[15] More recently, the city has allowed people with strong business connections in Santa Monica to become registered PEN users.

[16] Even in Santa Monica, the single citizen's initial request for on-line access to city staff reports lay dormant until the Council, Information Systems Director, and City Manager's Office determined that such a system merited consideration. It is interesting to note that more recent popular media accounts of PEN's history have erroneously promoted the idea that this citizen's request launched PEN.

References

Abramson, J., Arterton, C., & Orren, G. (1988). *The electronic commonwealth*. New York: Basic Books.

Arterton, C. (1987). *Teledemocracy*. Beverly Hills: Sage.

Bachrach, M., & Baratz, S. (1970). *Power and poverty*. New York: Oxford University Press.

Barrette, L. (1988, March). [Author interview with L. Barrette, Assistant City Manager, City of Santa Monica].

Bijker, W., Hughes, T., & Pinch, T. (Eds.). (1987). *The social construction of technological systems*. Cambridge, MA.: MIT Press.

Bremberg, G. (1990, April). [Author interview with G. Bremberg, Member of Glendale City Council, City of Glendale, California, April 25, 1990].

Cain, A., & Zorbas, E. (1983). *The Pasadena community and its information needs*. Pasadena, CA: The Pasadena Public Library.

California Commission on Campaign Financing. (1989). *Money and politics in the golden state: Financing California's local elections*. Los Angeles, CA: Center for Responsive Government.

Clark, T. (Ed.). (1981). *Urban policy analysis: directions for future research*. Beverly Hills, CA: Sage.

Constant, E. (1980). *The origins of the turbojet revolution*. Baltimore: Johns Hopkins Press.

Crenson, M. (1972). *The un-politics of air pollution*. Baltimore: Johns Hopkins University.

Curzon, S. (1990, April). [Author interview with S. Curzon, Director of the Glendale Library System, City of Glendale, California, April 12, 1990].

Danziger, J., Dutton, W., Kling, R., & Kraemer, K. (1982). *Computers and politics*. New York: Columbia University Press.

Donnelley Demographics. (1990). *Market Profile Database*. Anaheim, California.

Dosi, G. (1982). Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technological change. *Research Policy, 11*, 147-162.

Dutton, W., Blumler, J. G., & Kraemer, K. (1987). *Wired cities*. Boston: G.H. Hall.

Dutton, W., & Guthrie, K. (1991). An ecology of games: The political construction of Santa Monica's public electronic network. *Informatization in the Public Sector, 1*, 279-301.

Dutton, W., Guthrie, K., O'Connell, J., & Wyer, J., (1991, December). State and local government innovations in electronic services: The case in the Western and Northeastern United States. *Report prepared for the Office of Technology Assessment, Congress of the United States*.

Dutton, W., & Kraemer, K. (1985). *Modeling as negotiation*. Norword, NJ: Ablex.

Dutton, W., Wyer, J. , & O'Connell, J. (Forthcoming). The governmental impacts of information technology. In R. Bakner, B. A. Mamood, & R. Kauffman (Eds.). *Perspectives on strategic and economic value of information technology investment*. Harrisburg, P.A: Idea Group Publishing.

Dutton, W., Rogers, E., & Jun, S. (1987). The diffusion of information technology in households. In *Oxford surveys in information technology* (Vol. 4) (pp. 133-193). Oxford: Oxford University Press.

Evans, P., Rueschemeyer, D., & Skocpol, T. (Eds.). (1985). *Bringing the state back in*. Cambridge: Cambridge University Press.

Finkel, D. (1988). [Personal interview with member of city council, City of Santa Monica, March, 1988].

Guthrie, K. (1991). *The politics of citizen access technology: The development of public information utilities in four cities.* Unpublished doctoral dissertation. Annenberg School for Communication, University of Southern California, Los Angeles.

Guthrie, K., Schmitz, J., Ryu, D., Rogers, E. M., & Dutton, W. (1990, September). *Communications technology and political participation: The PEN system in Santa Monica.* Paper Presented to the Association for Computing Machinery's Conference on Computers and the Quality of Life, Washington, DC.

Jalili, J. (1990, January 29). [Personal Interview with City Manager, City of Santa Monica, Santa Monica, California].

Johnson, V. (1989, December 20). Personal Interview. Principal Librarian for Reference, Pasadena Public Library, Pasadena, California, January, 1991.

Johnson, V. (1991, January). [Personal Interview].

Kann, M. (1986). *Middle class radicalism in Santa Monica.* Philadelphia, PA: Temple University Press.

Kataoka, M., & Corey, A. S. (1979, October 9). Testimony Submitted to the Subcommittee on Science, Research and Technology of the U.S. House of Representatives.

Kraemer, K., & Dutton, W. (1979, May). The interests served by technological reform. *Administration and Society, 11,* 80-106.

Kraemer, K., King, J., Dunkle, D., & Lane, J. (1986). *Trends in municipal information systems, 1975-1985.* Irvine, CA: Public Policy Research Organization.

Kraemer, K., King, J., & Schetter, D. (1985). *Innovative uses of information technology in facilitating public access to agency decisionmaking: An assessment of the experience in state and local governments.* (Report Prepared for the U.S. Congress Office of Technology Assessment).

Krasner, S. (1984). Approaches to the state: Alternative conceptions and historical dynamics. *Comparative politics, 16,* 223-246.

Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.

Laudon, K. (1977). *Communications technology and democratic participation.* New York: Praeger.

Luther, C. (1989, July 10). Irvine mayor an anomaly in Republican heartland. *Los Angeles Times,* Orange County Edition, pp. 1, 16-17.

Maciuszko, K. (1990, November). A quiet revolution: community online systems. *ONLINE,* pp. 24-32.

MacKenzie, D., & Wajcman, J. (Eds.). (1985). *The social shaping of technology: How the refrigerator got its hum.* Milton Keynes, England: Open University Press.

March, J. G., & Olsen, J. P. (1989). *Rediscovering institutions.* New York: The Free Press.

McFall, R. (1990, April). [Author interview with R. McFall, Assistant City Manager, City of Glendale, California].

McIntyre, D. (1990). [Author interview with D. McIntyre, City Manager, City of Pasadena, California].

Nordlinger, E. (1988). Return to the state: critiques. *American Political Science Review, 82,* 875-885.

Phillips, K. (1988, February). [Author interview].

Raggio, C. (1990, May). [Author interview with C. Raggio, City Council Member, City of Glendale, California].

Ristow, L. (1990, April). [Author interview with L. Ristow, Manager of Information Services, City of Irvine, California].

Sackman, H., & Nie, N. (1973). *The information utility and social choice.* Montvale, NJ: AFIPS Press.

Sackman, H., & Boehm, B. (1972). *Planning community information utilities.* Montvale, NJ: AFIPS Press.

Schneider, V., Caron, J., Miles, I., Thomas, G., & Vedel, T. (1990, March). *The dynamics of videotext development in Britain, France and Germany: A cross-national comparison.* Paper presented at the Eighth International Conference of the International Telecommunications Society, Venice, Italy.

Stevens, E. (1990, March, July). [Author interview with E. Stevens, President of E— M— D— A—, Pasadena, California].

Stronjy, B. (1990). [Author interview with B. Stronjy, Assistant City Manager, City of Irvine, California].

Szynaka, E. (1990, February). [Author interview with E. Szynaka, Director of Information Services, City of Pasadena, California].

Thompson, R. (1990). [Author interview with R. Thompson, Principal Librarian, Support Services, Public Library, City of Glendale, California].

Van del Bel, H., & Rip, A. (1987). The Nelson-Winter-Dosi model and synthetic dye chemistry. In W. E. Bijker, T. Hughes, & T. Pinch (Eds.), *The social construction of technological systems* (pp. 135-158). Cambridge, MA.: MIT Press.

Williams, O., & Adrian, C. (1963). *Four cities*. Philadelphia: University of Pennsylvania Press.

Wilson, J. Q. (Ed.). (1968). *City politics and public policy*. New York: Wiley and Sons.

Winner, L. (1986). *The whale and the reactor*. Chicago: University of Chicago Press.

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.